PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PE18942PC00	**FOR FURTHER ACTION** See Form PCT/IPEA/416	
International application No. PCT/SE2004/000395	International filing date *(day/month/year)* 17-03-2004	Priority date *(day/month/year)*
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Telefonaktiebolaget LM Ericsson (publ) et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 5 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
14-10-2005	13-06-2006
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88	Authorized officer Stefan Dufva /LR Telephone No. +46 8 782 25 00

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: Cover sheet

International patent classification (IPC)
H04Q 7/38 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE2004/000395

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of:

- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-13 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 1-5 received by this Authority on 21-04-2006
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-4 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
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Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-21	YES
	Claims		NO
Inventive step (IS)	Claims	1-21	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-21	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The claimed invention

The claimed invention relates to a method and an apparatus for improved inter-RAT handover. According to the claimed invention, a mobile station being served by a network employing a first Radio Access Technology measures at least two different parameters for a plurality of neighbouring cells of at least a second radio access network. The handover is then performed depending on the results of the measurements.

The claims have been amended.

Documents cited in the International Search Report:
D1: US 2002093922 A1
D2: WO 03005759 A1
D3: US 2003207687 A1
D4: EP 961512 A1

D1 relates to a method and a system for performing handoff in wireless communication systems. D1 describes in paragraphs [0003-0004] different handover scenarios wherein handoff between WCDMA and GSM is one possibility. D1 then further describes in paragraphs [0025-0027] that the mobile station performs measurements of the received signals and that the measurements may be focused on several parameters such as SNR, received power, symbol error rate or E/N. The handover may then be performed depending on the result of the different measurements.

However, D1 fails to disclose how to measure at least two parameters for each possible target cell and reporting these parameters simultaneously in the same field and according to a respective limited value range.

.../...

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of: V

D2-D4 are considered to merely relate to the state of the art and are not commented on further.

To summarise, the claimed invention as in claims 1-21 is novel, considered to involve an inventive step and has industrial applicability.

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AMENDED CLAIMS

1. A method for enabling improved handover of a user equipment (3) communicating in a first radio access network (1) utilizing a first radio access technology (RAT), said method comprising the steps of measuring, at said user equipment (3), a first parameter for a plurality of neighboring cells (20) of at least a second radio access network (2) utilizing WCDMA, reporting said first parameter to a node (10) in said first network (1) and initiating handover to one of said plurality of cells (20) in said second network (2) based on said reported first parameter **characterized by** the further steps of:

measuring (S1) at least a second parameter for said plurality of cells (20) of said second network (2),

reporting (S2) said second measured parameters to said node (10) in said first network (1), and

initiating (S3) handover to one of said plurality of cells (20) in said second network (2) based on both of said first and second measured parameters, and wherein both of said first and said second parameter is reported simultaneously and said first parameter is reported according to one of a limited range of values, and said second parameter is reported in the same field using a limited value range, whereby each first parameter value is reported together with one of a plurality of possible limited value ranges.

2. The method according to claim 1, **characterized in that** said first radio access network (1) comprises one of GSM, WLAN and CDMA2000.

3. The method according to claim 2, **characterized in that** said node (10) is a base station controller (10) in a GSM radio access network (1).

4. The method according to claim 1, **characterized by** reporting said first parameter according to one of the ranges –14 dB or lower, -13 dB, -12 dB, -10 dB, -9 dB, -8 dB, -7 dB or lower, and reporting said second parameter according to one of the ranges –

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110 dBm or lower, -105 dBm, -100 dBm, -95 dBm, -90 dBm, -85 dBm, -80 dBm, -75 dBm or higher.

5. The method according to claim 1, **characterized by** said first parameter comprising information regarding the quality of the received signal at the user equipment.

6. The method according to claim 5, **characterized by** said first parameter representing the chip energy divided by noise, Ec/No.

7. The method according to claim 1, **characterized by** said second parameter comprising information regarding the signal strength of the received signal at the user equipment.

8. The method according to claim 7, **characterized by** said second parameter representing the Received Signal Code Power (RSCP).

9. The method according to claim 1, **characterized by** initiating handover to said second network (2) based on optimizing a predetermined function depending on said first and second parameter.

10. The method according to claim 1, **characterized by** initiating handover to a cell (20) of said plurality of cells in said second network (2) with the highest values on both said first and second parameters.

11. A user equipment (3) adapted for communicating with a first radio access network (1) utilizing a first radio access technology or a second radio access network (2) utilizing WCDMA, said user equipment (3) performing measurements of at least one cell in the second network (2) in order to determine a suitable handover cell while communicating over said first radio access network (1), said user equipment (3)

comprising means for measuring a first parameter and means for reporting said parameter to the first radio network, said user equipment is **characterized by** further comprising:

means (31) for measuring a second parameter, and

means (32) for reporting both said measured first and second parameters simultaneously to a node in said first radio access network, wherein said means (32) are configured for reporting said first parameter according to one of a limited range of values, and for reporting said second parameter in the same field using a limited value range, whereby each first parameter value is reported together with one of a plurality of possible limited value ranges.

12. The user equipment according to claim 11, **characterized in that** said reporting means are adapted for reporting said first parameter according to one of the ranges –14 dB or lower, -13 dB, -12 dB, -10 dB, -9 dB, -8 dB, -7 dB or lower, and reporting said second parameter according to one of the ranges –110 dBm or lower, -105 dBm, -100 dBm, -95 dBm, -90 dBm, -85 dBm, -80 dBm, -75 dBm or higher.

13. The user equipment according to claim 11, **characterized by** said first parameter comprising information regarding the quality of the received signal at the user equipment (3).

14. The user equipment according to claim 11, **characterized by** said second parameter comprising information regarding the signal strength of received signals at the user equipment (3).

15. The user equipment according to any of claims 11-14, **characterized in that** said first parameter is the Ec/No, and said second parameter is the RSCP.

16. A network node (4) in a first radio access network (1), utilizing a first radio access technology, capable of communicating with a user equipment (3) and receiving

measurements of neighboring cells (20) of a second radio access network (2) utilizing WCDMA from the user equipment, **characterized by**

means for simultaneously receiving (40) measured first and second parameters of the second radio access network (2) from the user equipment (3), wherein said receiving means (40) are configured for receiving said first parameter according to one of a limited range of values, and for receiving said second parameter in the same field using a limited value range, whereby each first parameter value is received together with one of a plurality of possible limited value ranges, and

means for selecting (41) a target cell of said neighboring cells (20) of said second network (2) for handover based on said received first and second parameters.

17. The network node according to claim 20, characterized in that said receiving means (40) are adapted for receiving said first parameter according to one of the ranges –14 dB or lower, -13 dB, -12 dB, -10 dB, -9 dB, -8 dB, -7 dB or lower, and receiving said second parameter according to one of the ranges –110 dBm or lower, -105 dBm, -100 dBm, -95 dBm, -90 dBm, -85 dBm, -80 dBm, -75 dBm or higher.

18. The network node according to claim 16, **characterized in that** said first parameter comprises information regarding the quality of received signals at the user equipment (3).

19. The user equipment according to claim 16, **characterized by** said second parameter comprising information regarding the signal strength of received signals at the user equipment (3).

20. The network node according to any of claims 16-19, **characterized in that** said received first and second parameters are the Received Signal Code Power (RSCP) and/or the chip energy divided by noise, Ec/No.

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21. The network node according to any of claims 16-20, **characterized in that** said node comprises a base station controller.
